Transition of pupils from Key Stage 2 to 3 deemed gifted and talented in mathematics: an initial study

Article

Published Version

TRANSITION OF PUPILS FROM KEY STAGE 2 TO 3

Geoff Tennant and Dave Harries make an initial study of pupils deemed gifted and talented in mathematics and describe the outcomes

Introduction

Through public schools, grammar schools and Universities, making special provision for those deemed to be Gifted and Talented - G&T - has, arguably, been the cornerstone of the UK educational system going back hundreds of years. More recently, a number of policy initiatives have been geared towards provision for G&T, including Excellence in Cities and the establishment of the National Academy for Gifted and Talented Youth - see DCSF 2009a - now succeeded by the International Gateway for Gifted Youth (IGGY 2011), along with the establishment of an A* grade at A level. At the same time, a number of initiatives point towards education being opened up for all children, witnessed by the increase in the school leaving age to 16 in 1972/73, and the increasingly large number of students achieving higher and higher GCSE results (see, for example, Stubbs 2010). Whilst in principle these policies can operate side-by-side, tensions between them are evidenced by concern, expressed in the Education Select Committee debate on the present Government's English Baccalaureate policy, that schools will be forced to concentrate resources on GCSE C/D borderline candidates at the expense of other student groups (Hansard 2011).

This article is concerned with one crucial component of provision for youngsters deemed gifted and talented specifically in mathematics in primary school: their experience as they proceed to secondary school. As can be seen both from an examination of relevant literature and from initial feedback, there is considerable scope for different definitions to apply, for different underlying approaches to be used, with work undertaken at primary school not meaningfully followed through in secondary school. Some preliminary findings are set out, along with plans for future research.

Transition from KS2 to 3: a brief background

This paper focuses on the transfer of entire cohorts, at age 11, from primary to secondary school. Historically the emphasis in supporting children's transition has been on administration and social continuity, such as parental concerns about bullying and new friendships for example, Brookes 2004;OFSTED 2002. Whilst there is some evidence of on-going work around academic progression between KS2 and 3 - for example, Brown and Maytum 2009 and, in a science context, some evidence of good results arising from bridging material (Braund and Hames 2005), a paper arising from the Cambridge Primary Review (Blatchford et al. 2008) highlighted academic transition from primary to secondary school as an area still in need of development. This is consistent with the findings of Chedzoy and Burden (2005) and also an earlier OFSTED report (2002), who found that children did much the same work in year 7 as in year 6. Whilst common transfer files have been in operation since 2000 - see DCSF 2009b - as a means of transferring information, including academic attainment, from primary to secondary schools, we were unable to find any associated research on them. This can possibly be taken as an indication that the important issue here is not the associated paperwork but the communication structures and vision of the people working in this crucial area.

Definition and nature of 'gifted and talented'

Whilst the distinction between gifted on the one hand and talented on the other is debated see, for example, NAGTY 2006, the following discussions will use the term Gifted and Talented (G&T) in accordance with common practice.

Broadly speaking, definitions for G&T come in two categories, quantitative and qualitative. Quantitative definitions include that used by the International Gateway for Gifted Youth (IGGY) of the *'top 5% nationally'* (IGGY 2011) and by *'Excellence in Cities'*, a programme discontinued in March 2006, *'of 5-10% within a school'* (OFSTED 2003).

Whilst at first sight these quantitative definitions would appear to be reasonably clear – albeit somewhat different – some follow up questions quickly demonstrate that this is not the case. Considering firstly the IGGY definition, on what basis would any one child be deemed to be within the *'top 5% nationally'*? What moderation is, or could be, going on to ensure that there is any type of equity across the country?

The 'Excellence in Cities' definition at least gets around the above problem – in identifying the 'top 5-10%' within a school – but potentially creates a number of others. No clear criteria are laid down as to why it should be 5% rather than 10% - presumably a school that has high academic outcomes by national criteria should go further towards 10% and conversely. Whatever assessments are used to determine whether children should be in this category, it is perfectly possible that a child deemed G&T in one school would not be so deemed in another. This is an important issue in the consideration of transfer of children from primary to secondary school, with issues around self-esteem and expectations of pupils, parents and teachers, needing careful thought.

There are also qualitative definitions. Drawing on the work of Krutetskii (1976), Kennard (2001: 2) suggests that high attaining children in mathematics may demonstrate a number of characteristics, including an ability to reason in a logical way and as a consequence develop chains of reasoning, and use mathematical symbols as part of the thinking process. These criteria can be useful, for example in helping to structure mathematical activities for individual children through highlighting characteristics to harness and develop. It is worth noting that children who achieve highly simply through the fluent application of set algorithms may be deemed G&T through a quantitative, but not by a qualitative, definition, an issue considered by Wilson and Briggs (2002).

However, there are potential problems with both qualitative and quantitative approaches regarding transition. Using the quantitative definitions particularly, it is perfectly possible that a child deemed G&T within a primary school will not be so deemed in the secondary school, and vice versa. It is clear that thought needs to go into the processes for the awarding of the term G&T, with particular implications for the transition process: there is the very real possibility that very different criteria will be applied, leading to confusion and demotivation at the transfer stage.

G&T: forms of provision

There are, in principle, various forms of provision for children deemed G&T. Particularly relating to normal classroom activities, these include:

- acceleration, for example doing GCSEs early;
- reaching the same end point as the rest of the class, but with less scaffolding;
- enrichment through depth, that is keeping to the same subject area as the whole class and looking to do further work based around that;
- enrichment through breadth, that is working on topics outside the normal school curriculum;
- the use of pupils as peer teachers.

Whilst acceleration appears very attractive and relatively easy to implement, there are a whole range of problems with this approach, as explored by Gardiner (2000). If, for example, A-levels are completed early, there is the danger that youngsters will be left with no further mathematics input in the last few years of school. Additionally, it cannot be assumed that bright youngsters will find it easy to work by themselves, nor, if a whole class is to be accelerated, that there are sufficient youngsters in a position to benefit from this

approach, possibly leading to the alienation of potentially strong mathematicians.

Alternatively one can look for various enrichment tasks. These may be completely separate from normal classroom activities, or aim to provide enrichment through depth. One example of the latter is given by Wilson and Briggs (2002): alongside division of decimal numbers, one might ask the question:

"If *a* and *b* are whole numbers, what could they be if $\frac{a}{b} = 4.125$?"

This is easily solved if one understands the relationship between decimals, vulgar fractions and division. This kind of activity can be solved in a variety of ways, including trial and improvement, which in principle promotes discussion and a development of the relationship between representational forms alongside routines for the solution of such problems. More generally, Casey suggests in Koshy and Murray (2002) a framework for providing suitable experiences for higher ability mathematicians, including such aspects as isomorphism, conjecture and proof, combined with curiosity and creativity. Whilst this enrichment approach is highly desirable, it may put additional demands on teacher time and resources.

Background literature: summary

It is clear from the above that there is considerable variation, at least in principle, in a number of key areas surrounding the transfer of children deemed Gifted and Talented from primary to secondary school. There is the very real potential for associated primary and secondary schools to approach G&T very differently, with little commonality of approach, or philosophical underpinnings. This implies that there is a possibility of work undertaken at primary schools either not being meaningfully followed through, or being in direct conflict with the approach taken in secondary schools. Whether these concerns can exist in practice is considered below.

Towards a research agenda

In working towards a clear research agenda, preliminary work has included discussions with school based colleagues and the use of preliminary questionnaires on a pilot basis. Our initial findings are largely in accordance with the issues found in the literature, including:

- little sense of any clear rationale behind activities for children deemed G&T;
- in the primary sector, teachers are left largely to themselves to work out what to do;
- acceleration is being used in both primary and secondary schools as one form of working with G&T children;
- little meaningful communication between primary and secondary schools on children deemed G&T;
- use made of 'extension activities' with little clear indication as to what that means in practice.

This reinforces the clear sense, which emerged from the literature, that the definition of G&T, how children are deemed to come into this category, and what one might do with children once they are so deemed, are all problematic areas. There is also the real possibility that different people working within the field will have different ideas about the designation of children as G&T and how to work with them subsequently – if indeed they have thought through the full implications. For transition between primary and secondary schools, there is the clear possibility of different underlying aims and ways of approaching G&T, with work undertaken in primary schools either ignored, or conflicting with work going on in secondary schools.

There would appear to be implications already arising from the work so far, with a need for:

- CPD for G&T coordinators in both sectors regarding the development of a cohesive rationale;
- initial and continuing training for all teachers, to explore the variety of ways in which the curriculum can be enriched and probed in greater depth;

- a clear expectation by teachers as to what they are trying to achieve within G&T programmes;
- clear lines of communication between schools, as children proceed from one sector to another.

In addition, this initial work provides the groundwork for research into this crucial area. A questionnaire can be refined and used to obtain a representative sample to the overall picture of transition from primary to secondary schools. Further fieldwork could include observation of classes specifically looking at the engagement of high attainers. Tracking children deemed G&T in primary school into secondary school is another approach, which will give rich case-study data. What will also be interesting will be to identify pairings of schools in which transition is dealt with well, in order to conduct in-depth work to identify features of 'good practice'.

In conclusion, while there are elements of good practice regarding transition for children deemed G&T in mathematics, there is evidence of a need for a more structured and cohesive approach.

The authors would be glad to hear from anyone, either with experiences to share, or with an interest in collaborating in further research.

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Note: More details of his research for those interested in contributing can be found at www.atm.org.uk/mt226

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